American Journal of Pharmacy

AND THE SCIENCES SUPPORTING PUBLIC HEALTH

CLAY TABLET LISTING MEDICINALS AND ANTEDATING THE EBERS PAPYRUS

(see page 421)

Since 1825 *December 1947*

American Journal of Pharmacy

Published monthly by the Philadelphia College of Pharmacy and Science
43d Street, Kingsessing and Woodland Avenues, Philadelphia 4, Pa.

Annual Subscription, $3.00 — Foreign Postage, 25 Cents Extra
Single Numbers, 30 Cents — Back Numbers, 50 Cents

Entered as Second-Class Matter March 27, 1937, at the Post Office at Philadelphia, Pa.
Under Act of March 3, 1879

'SUCRETS'

ANTISEPTIC THROAT LOZENGES

MEAN MORE PROFIT TO YOU!

Because:

1. Every sale brings you 33⅓% *profit* (8.3 cents profit on every 25-cent sale)!
2. 'Sucrets' lozenges are the largest and *fastest selling* 25-cent throat lozenge!
3. 'Sucrets' lozenges contain a reliable antiseptic and soothe *sore throats* in a matter of seconds!
4. Every purchaser of 'Sucrets' lozenges becomes a 'Sucrets' salesman!

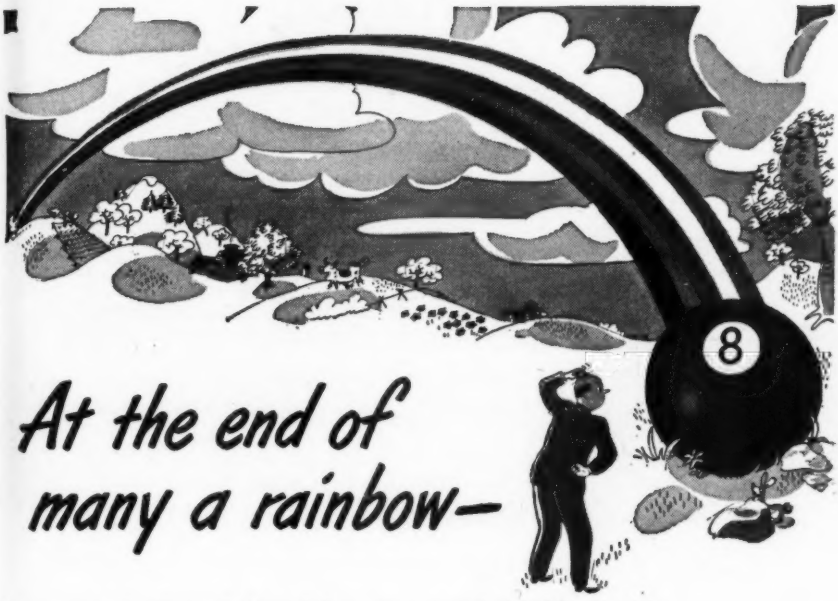
'Sucrets' supplied in boxes of 24 individually wrapped lozenges. Sharp & Dohme, Phila. 1, Pa.

SHARP & DOHME

THE ROAD TO JERICHO

The parable of the Good Samaritan is familiar to all. At least it was to young Eli Lilly when, more than ninety years ago, he stood before the Good Samaritan sign in Lafayette, Indiana, which was destined to forge the pattern of his business career. He remembered the story of the man who came down from from Jerusalem to Jericho; how he fell among thieves, was robbed and beaten and left half-dying by the side of the road. He remembered how both the priest and the Levite had passed him by. But more important, he remembered the Samaritan who went to the injured man's rescue, bound his wounds, and took him to the inn. It was this sign over a drug store that inspired Eli Lilly to become a pharmacist and that laid the foundation for the organization which for nearly three-quarters of a century has borne his name.

ELI LILLY AND COMPANY • INDIANAPOLIS 6, INDIANA U. S. A.



At the end of many a rainbow—

IF YOU GO to the end of a rainbow, so the fairy tales say, you'll find a pot of gold.

Of course, no grownup believes this. But it's surprising how many people believe what amounts to the same thing.

That is, many of us have a dreamy notion that somewhere, sometime, we'll come upon a good deal of money. We go along from day to day, believing that *somehow* our financial future will take care of itself.

Unfortunately, this sort of rainbow-chasing is much more apt to make you wind up behind the eight ball than with a pot of gold.

When you come right down to it, the only sure-fire way the average man can plan his financial security is through saving—and saving regularly.

One of the soundest, most convenient ways to save is by buying U. S. Savings Bonds through the Payroll Plan.

These bonds are the safest in the world. They mount up fast. And in just 10 years, they pay you $4 back for every $3 you put in!

P. S. You can buy U. S. Savings Bonds at any bank or post office, too.

SAVE THE EASY WAY... BUY YOUR BONDS THROUGH PAYROLL SAVINGS

Contributed by this magazine in co-operation with the Magazine Publishers of America as a public service.

Preferred Stock

Gain the dividends

from the gilt-edged quality of Parke-Davis SURGICAL DRESSINGS. They pay a high rate of interest in consumer satisfaction, create good-will for your pharmacy and give you a liberal profit margin. Your customers invest in the best when you sell PARKE-DAVIS—

ABSORBENT COTTON
ADHESIVE PLASTERS
READI-BANDAGES®

ABSORBENT GAUZE
GAUZE BANDAGES
ECONOMY PADS
(Handy 3" x 3" Sterile Gauze Pads)

Their quality begins with the finest materials available and is maintained by scrupulous care in processing and rigorous testing for strength and sterility. Their excellence is safeguarded by sturdy packaging.

Parke-Davis SURGICAL DRESSINGS are available in an assortment of sizes and styles to suit medical, surgical and first aid needs. Promote them by word-of-mouth and by display and declare yourself a dividend.

PARKE, DAVIS & COMPANY. • DETROIT 32, MICHIGAN

MEDICAMENTA VERA

AMERICAN JOURNAL OF PHARMACY

AND THE SCIENCES SUPPORTING PUBLIC HEALTH

Since 1825

Vol. 119. DECEMBER 1947 No. 12

CONTENTS

E D I T O R I A L

PROGRESS IN THE SURVEY

FEW indeed in the field of pharmacy have not heard of the Pharmaceutical Survey for in its quest for facts and figures pertaining to pharmacy it has permeated almost, if not every, area of the profession. In the time since its inception the Director, Dr. Elliot, has made every effort by means of questionnaire and personal contact to sound out the body and soul of pharmacy. It is to his credit that he has been overcome by neither its complexities nor the babble of its many different viewpoints.

Meetings of the Committee on the Pharmaceutical Survey are now being held at regular intervals and the accumulated data are being sifted and sorted in an effort to prepare its final report. At these meetings an observer can arrive at certain conclusions concerning the progress that is being made as well as sense some of the future difficulties.

It is clear that every effort is being made to obtain a factual background upon which to build the Committee's conclusions and recommendations. The effort expended, however, cannot hope to achieve perfect results since many of the facts needed just are not available and in many cases the "facts" collected represent personal subjective opinions with all the bias that such conveys. For example, it is not possible to determine how many pharmacists are engaged in professional work in some of the states since no accurate records are kept by many of the boards of pharmacy.

The future need for trained pharmacists is a matter that has been given careful thought, and a statistical approach leading to a tentative replacement figure has been suggested. From this it should be possible to state how many students a year should enter the field for optimum results in pharmacy.

Greater uniformity in procedure by the state boards of pharmacy has been highlighted as a most important goal. This should serve to fortify Secretary Costello in his efforts to achieve this which has long been one of his important objectives in the N. A. B. P.

Functional studies of just what a pharmacist is expected to do and what he does have brought forth significant data. The increasing trend toward prescription specialties has been shown and attention called to its impact on pharmaceutical education.

Many other phases and facets of pharmacy are being studied but possibly no field of pharmacy is being given more attention than that of pharmaceutical education. The Director, being both wise and a realist, is well aware of the fact that no really significant change can take place in the practice of pharmacy unless it be through basic changes in its educational program and pattern. To this end great and comprehensive studies of pharmaceutical education, past and present, have been made with the objective of prescribing for the future. Entering qualifications of students, teaching personnel, curriculum, salaries, buildings and equipment, student mortality (academic)—all have received their due share of attention. But here the situation becomes a little insecure. Assuming that drastic changes are needed in pharmaceutical education by what means can the recommendations of the Survey be implemented? Here is a point that probably concerns the Director for it does little good to write a "prescription" that will not be filled let alone taken!

The Pharmaceutical Syllabus Committee worked for years on a model curriculum but at the first sign that it might be used even loosely in evaluating college programs pressure was such that the Committee was disowned by its parent organizations and its work loudly disclaimed.

Dr. Elliot has taken two wise and even shrewd steps in helping to strengthen his coming recommendations. One is the close cooperation and integration of the Curriculum Committee of the A. A. C. P. headed by Dr. Webster with the Curriculum Subcommittee of the Survey headed by Dr. Blauch. The second is the membership on the Survey Committee of important members of the American Council on Pharmaceutical Education and the chairman of the Executive Committee of the A. A. C. P. Thus it is only reasonable to expect the Curriculum Committee of the American Association of Colleges of Pharmacy to recommend to that group essentially the recommendations of the Survey and for the American Council on Pharmaceutical Education to be prepared to require such changes by the colleges should they wish to continue as accredited institutions.

At the almost certain risk of being considered presumptuous this small voice would submit the following word of caution and advice.

Changes in curriculum and in other directions are needed in pharmacy but the need for reform is far from uniform the country over.

If the recommendations of the Survey take that form that can win the endorsement of the A. A. C. P. without breaking this important organization in pieces then all well and good. If the recommendations attempt to idealize in one step what is now an admittedly heterogeneous mixture of good and bad they are likely to fail. The strength of the A. A. C. P. is not to be underestimated nor is the spirit and willingness to fight of its members. It must be remembered that each state if it so wishes can operate as an independent unit providing there is unity of opinion between its colleges and its board. Any action destroying the present cooperation seen within the A. A. C. P. and the N. A. B. P. would be tragic indeed.

The Survey is doing a splendid job. We hope that the final step of implementation can be accomplished with the consummate skill and diplomacy needed in order to bring it about without serious side reactions in the "patient."

L. F. Tice

A CLAY TABLET WITH A PHARMACEUTICAL TEXT FROM MESOPOTAMIA, ABOUT A THOUSAND YEARS OLDER THAN THE EGYPTIAN PAPYRUS EBERS

By Theodor P. Haas, Ph. D.[1]

THE late Dean LaWall was very much interested in the history of pharmacy and was the author of the book "Four Thousand Years of Pharmacy." (1) For the Museum of the Philadelphia College of Pharmacy & Science, he wrote the text to little charts which were placed in a museum case. Being still of general interest, some of these charts are here quoted. LaWall wrote:

> "Pharmacy, the art of identifying, selecting, preserving and combining drugs of animal, plant, or mineral origin, and medicine, the art of restoring or preserving health by the administration of these substances, are closely related professions, which are indistinguishable in their early history because of the fact that their practice was combined in one and the same individual who was frequently the priest or religious leader as well. The beginning of both medicine and pharmacy are so closely interwoven with superstition and fable that it is difficult to separate the real from the mystical. Disease was first believed to be caused by evil spirits,[2] hence incantations, noises, and odors were as frequently employed, as remedies of a more material and efficacious character. The earliest pharmacists of any sort and among all peoples would almost certainly be, as we today designate them, herbalists."

Early man lived much closer to the surrounding Nature than we do today; he was well acquainted with animals and plants and the manner in which he could use them first for food, and secondly for remedies against diseases and for healing of wounds. E. D. Merrill is quite correct when he says: "Primitive man was an efficient economic botanist long before he was an agriculturist, as for thousands of years before he developed to the point of actually cultivating plants for

[1] Curator of the Museum and Medicinal Plant Specialist, Philadelphia College of Pharmacy and Science.

[2] Reginald Campbell Thompson, who has translated many pharmaceutical Assyrian texts (*Journal of the Royal Asiatic Society*), speaks repeatedly of the "Hand of a Ghost." In #4, 1929, *Journal of the Royal Asiatic Society*, he published an article: "Assyrian Prescription for the 'Hand of a Ghost.'"

food, he must have utilized the edible portions of wild species. It was this slowly-acquired knowledge that enabled him to select from many thousands of plant species the few that best met his needs." (2) This is also true where drugs and drug plants are concerned, for besides the food plants, the drug plants were very important to early man. Even today, they have not lost their significance: in the booklets which the Armed Forces of the U. S. and other countries have distributed among the troops to aid in the survival of men who became isolated, we find a lot of drug plants mentioned.

It is well to understand that in all centers where civilization started, we have very early signs of the presence of a pharmaceutical knowledge, based mostly on an empiric experience. Very often this knowledge is taught to man by gods. The Chinese, for instance, trace their pharmaceutical knowledge back to Shen Nung, the "Lord Divine Peasant" and it is very significant that they call this legendary figure "Father of Agriculture and Pharmacy." They say of him that he discovered herb medicines. With his own stomach for a laboratory, he tested herb medicines—so the Chinese say—all kinds of herbs, and was poisoned seventy times a day.(3) Very interesting is the story of the "herb against the death." The ancient god-man Gilgamish (Babylonian Gilgamish Epos ca. 800 B. C.[3]) searched for this herb, which man has never obtained, as did that powerful Chinese Emperor who desired to find it in Japan. Following a Chinese legend he had sent a general with several hundred men to the island where the sun rises,[4] and who never returned to China because they could not find this precious herb![5]

In the Old World we have about four or five centers in which, perhaps, independent from each other, civilizations have developed. The first center was, as far as we know today, in Southern Mesopotamia. The people who were living there about 5000 or 6000 years ago were the Sumerians. They were organized in city-states, headed mostly by a king-priest or queen-priestess. We know the names of some. The University Museum in Philadelphia, especially

[3] The Babylonian form of the Gilgamish Epos, dealing with the problem of death, has its roots in much older Sumerian texts. It was found in clay tablets in Assurbanipal's Library (ca. 800-600 B. C.) in Ninive-Kujundschik, and was translated into different modern languages.

[4] The name of that country, "Japan," originates from the Chinese "Tschipen kuo," Land or State of the Rising Sun, which Marco Polo wrote in his Italian manner: "Zipangu."

[5] It was Emperor Shih-Wang-ti, or Tsin-Shi-Whang-Ti, about 220 B. C., the unifier of ancient China. He began to build the Great Wall.

rich in Mesopotamian treasures, has a little head figure of the priest-king Gudea, probably of Lagash, now called Tello (2400 B. C.); the gold treasure of Queen Shubad of Ur (about 3000 B. C.), and of especial interest the golden harp from Ur, taken from the king's grave, which shows on its front side scenes of the Sumerian Gilgamish Epos (3000 B. C.), demonstrating animal tales where animals play the part of human beings. They all give proof of the high state of art and culture of this remote time. The Sumerians were not Semites, though their culture was later absorbed by the Semitic Babylonians and Assyrians. Sumerian was the earliest written language. About 2600 B. C. Akkadian, a Semitic language began to replace Sumerian in Babylonia.

At the time of the Sumerians, there was in the Indus Valley a similar culture, the remains of which were relatively lately discovered in Mohenjo-daro (Sindh province) and Harappa (Punjab province) (4). This civilization covered a large area in Pakistan of today. This culture is named "Indus Valley Civilization." We have samples of the highly developed art of the people. In addition to pottery we have figures and seal cylinders similar to those from Mesopotamia. In Ananda K. Coomaraswamy's book "History of Indian and Indonesian Art" (5) there is a picture of a seal cylinder with leaves of a *Ficus religiosa,* the tree under which much, much later Buddha received his enlightenment. The leaves have elongated tips (where the water drops off), and this can be seen very well in the seal print. Pictures in the book mentioned, show an astonishing similarity between Sumerian and Indus-Valley art. There is, for instance, a figure of a head of a bearded man from the Indus-Valley, and in No. 7 of the *Journal of the Royal Asiatic Society* of 1930,[6] there is a similar figure, excavated in Kish in Southern Mesopotamia which looks exactly alike in their design. In an article in the same journal S. Langdon speaks of the possibility of a common origin of the Sumerians and the Indus-Valley people.[7]

Egypt, the next center, is far better known. As in Mesopotamia, after a primitive prehistoric period, a relatively high culture starts suddenly, without any transition to the former, under King Menes (3200 B. C.) the first king of Upper- and Lower-Egypt.

---

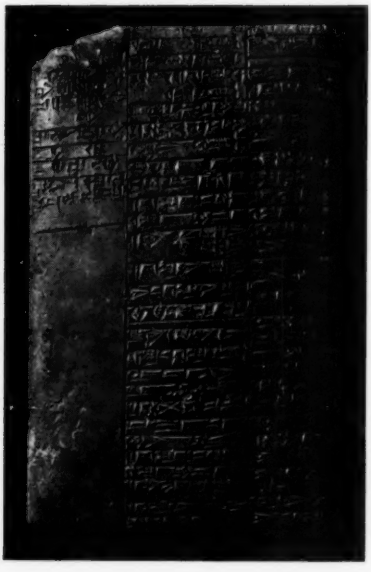
[6] *Journal of the Royal Asiatic Society,* #7, 1930 (plate 8), fig. 5, Excavations at Kish 1928-29, by S. Langdon. Kish was an important city in Babylonia from the Fourth Millenium B. C. to the Fourth Century A. D.

[7] Compare footnote, page 427.

Finally follows the Greek civilization which has influenced so much the artistic, philosophical and scientific development of Europe.

These civilizations may have developed independently, but trade relations may have linked them together. Trade took place very early in history. We know that during the Middle-European bronze-era this metal was introduced there by trade. We shall say more about this problem later.

Only the Chinese center developed completely isolated; entirely by itself. The Chinese thought for a long while that their country was the center of the world and therefore named it "The Middle



Kingdom." It was only through the famous expedition of the General Chang Ch'ien against the Huns [8] that the Chinese got knowledge of countries far west (reaching to the Mediterranean Sea). This was about 120 B. C.

LaWall wrote in the text of his chart: "Egyptian pharmacy is the earliest of which there is a written record, dating—in the Papyrus

[8] The Huns (and other Central-Asiatic nomadic tribes) invaded China repeatedly and against them the Great Wall was built. (Compare footnote page 422.) One of the Hun tribes under Attila penetrated into the heart of Europe in about 450 A. D.

Ebers—as far back as 1550 B. C." When these charts were studied it was thought strange that there was nothing in the Mesopotamian culture circle. The Babylonian Section of the University Museum was contacted, and Drs. Leon Legrain and Noah Kramer, the Curators, called attention to an article "Nippur Old Drugstore" in the *Bulletin University Museum,* January 1940 (vol. 8, No. 1), written by the former.

A cast, made from the original clay tablet, in the possession of the University Museum, was obtained and placed in the exhibits of the Museum of the Philadelphia College of Pharmacy & Science. With the kind permission of the University Museum, Dr. Legrain's translation of the text in Sumerian language is reproduced here, together with two photos, showing both sides of the tablet.

	[Obv. destroyed]	
Ob:	*šim-si dé*	Balsam . . . is poured;
	kaš ab-ta-dé	A potion is poured out of it;
	izi ù-ta-ab-dé	pour it out of the fire;
	a-bi ià níg-LAG íd-da (:)	(into) the liquid introduce
Rev:	*ù-tu*	oil from . . . the river (:)
	lú al-nag-nag.	The man shall drink it
	•	•
	giš-ma + gunu babbar	White *ma* . . . wood,
	e-rí-na ú(d)-nannar	Twig (?) of Moon plant,
	ù-gaz	pound;
	kaš-e ù-tu	introduce in the potion.
	lú al-nag-nag	The man shall drink it.
	•	•
	numun níg-nagar-šar	Seed of the "carpenter,, herb
	šim-mar-ka-zi	balsam *mar-ka-zi,*
	ú ḫa-šu-an-um	plant *ḫa-šu* of *Anu,*
	ù-gaz	pound;
	kaš-e ù-tu	introduce in the potion,
	lú al-nag-nag	The man shall drink it
	•	•
	lú-ba-šu-gìr	Unto the man, whose foot
	ú-a-gil ab-dù-dù	caught a burn, from
	bar níg-KA + im-na	things in the furnace,
	nidaba-si-šar	a full-barley herb,
	mun	salt,
	pisan + ziz	cassia,

ù-ḫal-la	rush on;
úr-e ù-ra	plaster on the leg;
kaš-sig 3	fine barley beer,
a-izi ù-ni-tu 3	pour in hot water;
dù-a-bi an-sud-bi	on the whole stretch
ù-ni-sud	anoint it;
ià-giš ù ià-erin	sesame and cedar oil,
giš ù-ku	*ašuḫu* wood,
ù-gaz	pound; it shall be
an-tu-tu	put over it
muš-a ù-laḫ ù-gaz	A water snake, wash, pound;
ú ama-maš-um-kas-šar	a plant *ama-maš-um-kas-šar*
e-muš + muš-na giš-gír	a root of thorn,
nidaba gaz	crushed barley,
še gam-gam zì	wheat (?) reduced to flour
Ku-si-ib Ḫu	the herb of the *kusipu* bird
a ù-dé	pour into water,
ù-izi	boil on fire.
a-bi an-tu 3*-tu* 3	the water is poured over,
a ù-ni-tu 3	pour water on it.
ià-giš ù ià-erin	sesame and ceder oil
šà-ki an-tu-tu	on top shall be put

•

ubur-bur šà-ga áb	The milk teat of a cow,
ù-laḫ ù-gaz	wash, pound;
ḫad giš-gír	a thorn rod,
ù-mul	polish (peel ?);
giš-ma + gunu babbar	White *ma* . . . wood,
mun-íb	with salt,
a ù-dé	pour into water;
ù-izi	boil on fire;
a-bi an-tu 3*-tu* 3	the water is poured over.
a ù-ni-tu 3	pour water on it.
izi ú-a-gil an-tu-tu	on the fire-burn it is put.

•

[ ]*-dun* (?)	[ ] . . .
[ ]*-bur giš-a-tu-gab-*	
ta a-an-ta rá-a	From a (tub ?) of *ṣarbatu*
saḫar dug-giš-bi	wood, water on high, moves
Ku-šum-ma geštin	dirt of the foot jar.
ú níg-gíg	Slashed stem of vine
ú a-rí-na	*azallu* plant,
e-muš + muš ù giš	*arína* plant,
izi an-tu-tu.	root and stock,
	are put in the fire.

This translated text, though it is incomplete, is rather interesting, and contains a lot of riddles for the botanist as well as the pharmacist. Unfortunately the translator was not a botanist; this is a common fault with translations of ancient texts. For instance, the Chinese writer of the book "A Short History of Chinese Civilization" (3) translates a word of Confucius, which surely means a cereal, as maize. Being an American cereal, maize was not existent in China at the time of Confucius. It was first mentioned much later in China, relatively shortly after the discovery of the Western hemisphere.

Following the advice of Dr. Legrain, the writer of these lines used, besides other literature, the hand-written book of Reginald Campbell Thompson "The Assyrian Herbal" (6). Yet, it did not help very much.

In "The Assyrian Herbal" sesame is repeatedly mentioned, and also "azallu" (see translation of the Sumerian text), which is translated as hashish, with the remark: "a drug for the depression of spirits." In the tablet-text it is then said, it was "put in the fire," probably to make a narcotic smoke.

It is remarkable that the Sumerians treated burns with oil, with sesame oil, and, of course, that they mentioned hashish as a narcotic.

The botanist is puzzled by the fact, that about 5000 years ago products of *Indian* plants were used in Mesopotamia. Sesame oil originates from *Sesamum indicum L.* and hashish from *Cannabis sativa L., var. indica Lam.* How did they come at these early times from India to Mesopotamia? Coomaraswamy writes ". . . the presence of teak and Indian cedar in Babylon are evidences of a seaborne trade, as early as the eighth century B. C., nor is there much reason to doubt that it had begun still earlier." S. Langdon reports in his article No. 7 of the *Journal of the Royal Asiatic Society* of 1931,[9] that in Kish in Southern Mesopotamia, Indus-Valley seal cylinders were found. This is a proof of trade relations between the Sumerians and the Indus-Valley people about 5000 years ago. Though we have no dates we can suppose with great probability, that food and economically important plants and their products came with these trade relations from India to Mesopotamia.

Though the text of the Sumerian clay tablet cannot compete with the text of the Papyrus Ebers, it is very interesting to know of the

[9] S. Langdon, "A New Factor in the Problem of Sumerian Origins," *Journal of the Royal Asiatic Society*, # 7, 1931, pp. 593-96.

existence of a prescription about a thousand years older than the famous Egyptian document, and the presence and the use of Indian drugs in Mesopotamia 5000 years ago.

LITERATURE

(1) Charles H. LaWall: "Four Thousand Years of Pharmacy." Philadelphia, 1927.

(2) E. D. Merrill: "Domesticated Plants in Relation to the Diffusion of Culture." *The Botanical Review 4*:15 (1938).

(3) Chi Ts'ui: "A Short History of Chinese Civilization." London, 1943.

(4) Sir Hubert Marshall: "Mohenjo-daro and the Indus Civilization." London, 1931.

(5) Ananda K. Coomaraswamy: "History of Indian and Indonesian Art." New York, 1927.

(6) Reginald Campbell Thompson: "The Assyrian Herbal." London, 1924.

(7) Different articles in the *Journal of the Royal Asiatic Society* (1925-1940). (Articles by Ernest Mackay, S. Langdon, Reginald Campbell Thompson and others.)

WAX FROM SUGARCANE

By T. Swann Harding

HONEYBEES make wax as well as honey, and ingenious man finds use for the wax. It is rather curious that the sugarcane plant does the same thing, only both the sugar and the wax differ markedly from those the bees make. Sugarcane makes a hard wax that can be used in shoe, floor or furniture polishes, as well as for many other special purposes.

Sugarcane wax appears as a whitish powdery deposit on the surface of the canes. Exactly why it is there is unknown, but it does seem that differences in the porosity and thickness of the waxy coat tend to control the rate at which water evaporates from sugarcane rind. There are varietal differences in the quantity of wax present, though cultural conditions also have an influence here.

Away back in 1841 a New Orleans apothecary named Avequin isolated and purified some of this whitish deposit on the cane, which had not excited curiosity before that, though the plant had long been grown for its sugar. The famous Dumas and later chemists determined the composition of the material and the quantity present.

More accurate work done recently discloses that sugarcane stalks contain from a tenth to a quarter of a per cent of crude wax and also almost as much fat! If this doesn't sound like a great deal remember it adds up to two or three pounds per ton of cane. Fortunately one of the most important Louisiana canes is also one of the heaviest wax producers. Yet even then recovery from the cane itself would be uneconomical.

But the wax is very much more concentrated in the waste filter-press cake that remains after the cane is crushed and the juice clarified. In sugar-making the juice is first treated with lime, then the sediment is filtered out. The resulting press cake is used for fertilizer, but removal of the fat and wax from it would make it even better for that purpose. This cake contains from as little as 3 to as much as 19 per cent of the wax, depending on the cane variety and the processing method.

Nearly nine tons of air-dry press cake remain behind after a thousand tons of sugarcane have been processed. From this, 1,600

pounds of crude wax can be recovered which yields 1,120 pounds of dark hard wax (850 pounds when fully refined) and about 270 pounds of "pitch." In addition there can be separated from the crude wax a fatty fraction weighing 480 pounds which yields a wide variety of complex compounds which would prove useful industrially.

The process requires the use of acetone and alcohol as solvents to separate the wax from the fatty matter. It is estimated that the cost of recovery would not exceed nine or ten cents a pound. This would make sale at fourteen or fifteen cents profitable and that price is well within the range of the price for similar waxes.

Sugarcane wax actually has been produced commercially. A plant was established at Natal, Union of South Africa, in 1916 and by 1924 it was exporting six thousand tons of the wax, but price conditions became unfavorable and production ceased. During World War II plants were established in Cuba and in Australia. But a method recently developed by Department of Agriculture scientists and technicians at Houma, La., is more efficient than any previously used, and the product can better be fitted to the domestic market.

No small amounts of these sugarcane byproducts would become available if the recovery method were used by all sugar mills in this country, in Hawaii, Puerto Rico, and Cuba. Without counting in the rest of the world some 38 million pounds of good hard wax could be produced annually, along with 22 million pounds of the fatty materials.

The term wax can easily be misleading because we commonly use it to refer to the physical state of a substance rather than to its composition. Many so-called waxes in commerce are really fats or hydrocarbons. Sugarcane wax is a true wax and true waxes are in chemical terms esters of higher fatty acids with a monohydric alcohol of high molecular weight.

Hardness is of primary importance and sugarcane wax is a hard wax. When purified it is pale yellow to dark brown. It melts at 74-80 degrees Centigrade and has a specific gravity just under 1. It compares favorably with other vegetable waxes in hardness, and yields a clear liquid on melting.

In general sugarcane wax resembles carnauba wax, the basic ingredient of high-grade wax polishes, which has for years been a vital import item and was in special demand during the war. Carnauba wax is painstakingly derived from fresh young leaves of a Brazilian

palm by drying them and beating them together. In 1940, imports of less than 17 million pounds were valued at 8 million dollars.

Such waxes have a wide variety of uses. Even before the war demand was increasing rapidly. Some of the most important uses of such wax as that from sugarcane are: shoe, floor, and furniture polishes; waterproofing and electrical insulating compositions; leather finishing; wax varnishes; sealing compositions; phonograph records; coating material for typewriter carbon paper; candles; printing inks; finishing materials and for stiffening fiber containers.

Research continues in the transformation of this waste material into a valuable coproduct of sugar from sugarcane. Large sugar mills would find it both practicable and profitable to process their own press cake as it comes without need for drying it. It might prove even more profitable to develop wax recovery at a centralized plant operating the year round on dried press cake from many sugar mills.

In either case the products would be: an extracted press cake with improved fertilizer value; a hard wax refined to such degree as was necessary for the use intended; byproducts from the fatty fraction; and the dark wax or "pitch." While the last two items are still of speculative value, they have interesting possibilities inviting further research. For instance the sterols from the fatty fraction might prove useful in both the vitamin and the cosmetic fields.

All told, a valuable coproduct can be derived from sugarcane processing, along with the primary product, simply because the cane has thoughtfully engaged in the production of wax and fat as well as sugar.

BACTERIOLOGICAL STUDIES OF A SERIES OF POLYCYCLIC DYES

By Gustav J. Martin, D. Sc.*

THE acridines and their applications in chemotherapy have been recently reviewed (1) but other polycyclic dyes have not recently been given much consideration.

The thiazine dyes have been studied using methylene blue as the representative compound (2). Very few of the other members of this series have been tried. In the oxazine series, oxazine, prune and new methylene blue have been investigated (2). Of the azine dyestuffs, eurhodine, safranine, induline and naphthalene red were tested. In the pyronine series, pyronin, acridine red, eosin and erythrosin were considered (2). Interest in these compounds was current during the period around 1900. The vast majority of these dyestuffs have never been studied by modern bacteriological methods.

It was therefore deemed advisable to investigate and reinvestigate a series of these compounds. In this study, some 50 chemicals have been studied for their in vitro activity against *Staph. aureus.*

Method and Results

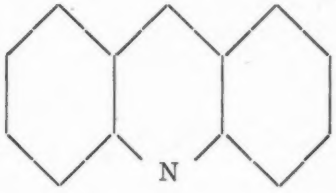
Staphylococcus aureus was the test organism. The inoculating dose for 10 ml. of broth medium was approximately 200,000 microorganisms. Chemicals were added to the broth; pH and volume adjusted between experimental tubes and controls; then the inoculated tubes were read using uninoculated tubes as controls. This was done to prevent color interference in the nephelometric readings. A series was initially done checking bacteriological counts against nephelometric readings. The incubation period was 16 hours. Proflavine dihydrochloride was used throughout as the standard for comparison. Chemicals are listed briefly as more active (AA), as active (A), less active (I) and totally inactive (II) as compared to the proflavine dihydrochloride standard.

* Research Laboratories, The National Drug Company, Philadelphia, Pa.

TABLE I

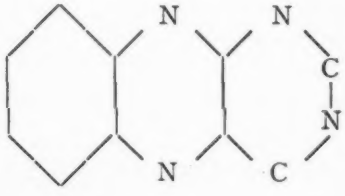
COMPARISON OF ACTIVITY CONTRASTED TO PROFLAVINE DIHYDROCHLORIDE OF A SERIES OF COMPOUNDS

Acridines



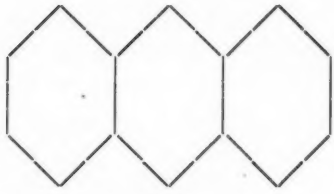
Acridine Orange, A
Acridine Yellow, A
Proflavine, A

Alloxazine and Isoalloxazines



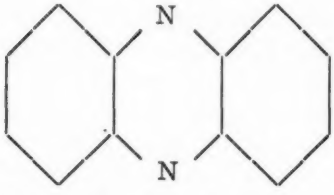
Alloxazine, II
7-Aminoalloxazine, I
8-Aminoalloxazine, A
7-Amino-8-hydroxyalloxazine, I
8-Carboxyalloxazine, I
7-Carboxy-8-aminoalloxazine, I
Lumichrome, II
Lumiflavine, II

Anthracene



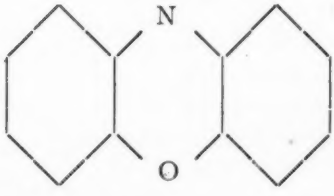
Anthraquinone, II
2-Aminoanthraquinone, II
1-Aminoanthraquinone, II
2-Hydroxy-3-methylanthraquinone, II
3-Methylanthraquinone, II

Azines



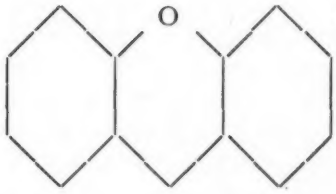
Methylene Gray ND, I
Neutral Red, I
Phenosafranin, I
Pyocyanine, I
Resazurin, I

Oxazines



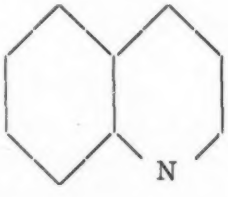
Gallocyanine, I
Capri Blue, AA

Pyronines



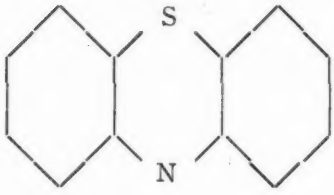
Acridine Red, A
2, 7-Diaminoxanthone, I
Fluorescein, II
Pyronin Y, A
Rhodamine B, A
Tetrabromofluorescein, II
Xanthone, I
Xanthydrol, II

Quinolines



Ethyl Red, AA
8-Hydroxyquinoline, A
6-Methoxyquinoline, I
Quinoline ethiodide, I

Thiazines



Methylene Blue, A
Methylene Violet, A
Thionin, I

Miscellaneous

Auramine, A
Arcaine, II
5-Aminouracil, AA
Alpha Benzildioxime, I
Camphoric Acid, I
Cadaverine, I
Dimethylaminoazobenzene, I
1, 10-Diphenic acid, II
Diphenylhydantoin, II
Diphenylthiocarbazone, A
Dipyridyl, I
2-Methylmercaptobenzothiazole, I
Octopine, I
Phthalocyanine, I
Pyridium, I
Thioflavine, AA
Tolylene Blue, I
Tetramethyldiaminohydroxytriphenylmethane, II
2, 2′, 4, 4′-Tetranitrodiphenyldisulfide, I
2, 2′, 4, 4′-Tetramino-5, 5′-dimethyldiphenylmethane sulfate, A

The most active compounds of the series were capri blue which is an oxazine dye, ethyl red which is a quinoline derivative, 5-aminouracil and thioflavine. No single series had a monopoly on activity.

In general, all anthracene compounds were inactive by comparison as were all of the alloxazines and the isoalloxazines studied. The azines were intermediate. The acridines, oxazines, pyronines, quinolines and thiazines all had active members. It is, considering the limited series here reported, not logical to attribute superior activity to any given ring structure, but a few comparisons of interest can be made. 2, 7-Diaminoxanthone is the structural analogue of proflavine and is markedly inferior in antibacterial potency. This would tend to give the acridine nucleus superiority over the pyronine nucleus. Thionin is the thiazine analogue of proflavine and 2, 7-diaminoxanthone and is inferior to acridine. Thus, it may be said that the acridine nucleus is superior to both the pyronine and the thiazine nuclei.

A comparison of acridine orange, acridine red, rhodamine-B, pyronin-Y, methylene blue, methylene gray ND and capri blue would tend to indicate that in this series of three ring, mono or dialkyl amino substituted compounds, the oxazine and the thiazine nuclei conferred greater antibacterial power than the acridine, pyronine, or the azine nuclei. Thus, in one series the acridine is superior to the thiazine while in the second series it is inferior.

It is painfully apparent that there exists a vast world of chemicals which have never been investigated bacteriologically or pharmacologically. The number of these chemicals increases daily. There is no possibility of exhausting the field or even of gaining insight into the probabilities until these compounds have been tested in a purely empirical manner. In this report, it is hoped that an indication has been given for the revival of interest in the field of application of dye chemotherapy.

Summary

A series of 50 compounds mostly dyes have been tested for their antibacterial power using *Staph. aureus* as the test organism. Compared to proflavine dihydrochloride, the dyes (capri blue, ethyl red and thioflavin) and the pyrimidine (5-aminouracil) showed greater activity.

REFERENCES

(1) Martin, Gustav J.: *Medicine 23*:79 (1944).

(2) Fischl, V., and Schlossberger, H.: *Handbuch der Chemotherapy.* Leipzig, 1932.

BOOK REVIEWS

Essentials of Prescription Writing. By Cary Eggleston, M. D. Eighth Edition, 155 pages including index. W. B. Saunders Company, Philadelphia, Pa., 1947. Price $2.00.

Prescription writing is almost a forgotten subject in the medical curriculum and yet it should not be. The author of this small text has been responsible for seven previous editions, the first having originated in conjunction with his efforts in teaching prescription writing in 1913.

Although this text gives certain fundamentals which are quite useful to the medical student such as prescription construction, the elements of Latin, dosage forms, etc., it is doubtful whether the book now constitutes a modern concept of prescription practice. In the first place it would seem practical to omit all Latin in view of the current trend of pharmaceutical nomenclature. Although pharmacy students must still be taught Latin in order to interpret prescriptions originating from older physicians, there seems to be little justification for its continuation in the training of the new generation of medical practitioners. The same might be said for the apothecaries' system. Metric dosage schedules are now preferred almost universally and no advantage is seen in continuing the dual system, long a burden to the medical student.

The review finds a lack of consistence in the sequence of English titles, many being in the U. S. P. XII style while others are in the new style of the U. S. P. XIII.

The discussion of salol and keratin coatings as means of producing enteric coatings is thought to give the practitioner an altogether too optimistic a view of the probability of success with such technics. Under suppositories no mention is made of glycerinated gelatin as a base and yet it is well established that theobroma oil is quite unsatisfactory for certain medicaments. No mention is made of the problem of prescribing non-official products although it is well established that these constitute over half the products prescribed. Unless the practitioner understands this problem considerable difficulty can be presented to the pharmacist.

The need for a text on prescription writing is clearly established but it would appear that this text needs to be revised in the light of modern practice and not be continued on the basis of the momentum accomplished in the past.

Formulary—University Hospital, Ann Arbor, Michigan. By Don E. Franke, Editor; Second Edition, 422 pages, incl. index. University Lithoprinters, Inc. Ypsilanti, Mich., 1947. Price $3.75.

The contributions to the modern hospital made possible by a well-trained hospital pharmacist are rapidly being recognized in the United States. The editor of this formulary is one of the outstanding hospital pharmacists of the country and this formulary is a perfect example of one aspect of modern hospital pharmacy. It would be difficult to find a book giving in brief style data on all of the really important drugs available today and yet this book does just about that.

Drugs are classified according to their therapeutic use and the essential information concerning each is given so that the physician will be able to see at a glance just how it should be prescribed. Thus the pharmacology of the drug is given, the available dosage forms and any other data needed to satisfactorily prescribe it. The exclusive use of the metric system throughout the book is both commendable and in agreement with modern trends.

One is impressed with the up-to-date character of the drug list. Drugs such as Methadon, Metopon, Propylthiouracil, Gelfoam, etc., are standard items.

The Formulary is not, of course, a complete list of all useful drugs for such is not its intent. It does describe those available in the Pharmacy of the Ann Arbor hospital and it is believed that those included cover almost every necessary substance.

The use of the formulary system in large hospitals is growing and this one might well serve as a standard for those who are contemplating such action.

Pharmacology, Therapeutics and Prescription Writing. For Students and Practitioners. Fifth Edition by Walter Arthur Bastedo. 840 pages with 82 lliustrations. W. B. Saunders Company, Philadelphia, Pa., 1947. Price $8.50.

This text is written in the style which classifies it more in the category of materia medica than pharmacology. The therapeutic use of drugs is stressed more than their pharmacology. Whether this is an advantage or a disadvantage depends largely to which school of thought the reader belongs.

The subject matter is divided into three parts: Part I is concerned with some general considerations such as the constituents of organic drugs, pharmaceutical preparations, dosage, routes of administrations, etc. Part II discusses the drugs used in the treatment of disease. These are grouped into the standard categories with drugs used for similar purposes listed together. Part III is a very brief section devoted to prescription writing.

Many of the newer drugs introduced in recent years are included in the text and it has been revised in accordance with the U. S. P. XIII and the N. F. VIII. The author has not overlooked those drugs which, although non-official, are important in therapeutics. The result is a modern collection of those medicinal agents of importance today.

The book is definitely on the practical side which makes it particularly useful for the practicing physician. Teachers of pharmacology in its current sense may find it inadequate from the standpoint of the mechanics of drug action. It is admittedly difficult to present such a vast subject to the satisfaction of everyone concerned.

Students of pharmacy and pharmacists will not find the book burdensome to read and readily understand and it might well serve as a useful text in the college of pharmacy where emphasis is placed on materia medica and therapeutics rather than experimental pharmacology.

INDEX TO VOLUME 119 OF THE AMERICAN JOURNAL OF PHARMACY

AUTHOR INDEX, 1947

(B)—Book Review
(E)—Editorial

SUBJECT INDEX, 1947

(A)—Abstract
(B)—Book Review
(E)—Editorial
(S)—Solid Extract

THE AMERICAN JOURNAL OF PHARMACY

A Record of the Progress of Pharmacy and the Allied Sciences

Since 1825

Published Monthly by

THE

PHILADELPHIA COLLEGE OF PHARMACY AND SCIENCE

43d Street, Kingsessing and Woodland Avenues
Philadelphia 4, Pennsylvania

Volume 119

Philadelphia, Pa.

1947

IODINE

Essential Ally of the Profession for

Prevention.. Diagnosis.. Therapy

In addition to the many Iodine specialties, the following Iodine preparations, official in United States Pharmacopœia XIII and National Formulary VIII, are widely prescribed in everyday practice:

U.S.P. XIII

CALCIUM IODOBEHENATE
CHINIOFON
CHINIOFON TABLETS
DILUTED HYDRIODIC ACID
HYDRIODIC ACID SYRUP
IODINE
STRONG IODINE SOLUTION (LUGOL'S)
IODINE TINCTURE
IODIZED OIL
IODOPHTHALEIN SODIUM
IODOPYRACET INJECTION
SODIUM IODIDE
POTASSIUM IODIDE

N.F. VIII

AMMONIUM IODIDE
FERROUS IODIDE SYRUP
IODINE AMPULS
IODINE OINTMENT
IODINE SOLUTION
PHENOLATED IODINE SOLUTION
STRONG IODINE TINCTURE
IODOCHLOROHYDROXYQUINOLINE
IODOCHLOROHYDROXYQUINOLINE TABLETS
IODOFORM
POTASSIUM IODIDE SOLUTION
POTASSIUM IODIDE TABLETS
COLLOIDAL SILVER IODIDE
SODIUM IODIDE AMPULS
THYMOL IODIDE
YELLOW MERCUROUS IODIDE
YELLOW MERCUROUS IODIDE TABLETS

***NOTICE* NEW NAMES FOR IODINE TINCTURES**

IODINE TINCTURE U.S.P. XIII (2%)
(Formerly official in U.S.P. XII as Mild Tincture of Iodine)

•

STRONG IODINE TINCTURE N.F. VIII (7%)
(Formerly official in U.S.P. XII as Tincture of Iodine)

Iodine Educational Bureau, Inc.

120 Broadway, New York 5, N. Y.

American Journal of Pharmacy

The American Journal of Pharmacy is the oldest continuously published scientific periodical of its kind in America, having been established by the Philadelphia College of Pharmacy in 1825. After the original issue there were three other preliminary numbers until 1829, when regular publication began. From then until 1852 four issues were published annually, with the single exception of 1847, when an additional number appeared. Six issues a year were printed from 1853 to 1870, at which time the Journal became a monthly publication.

Former Editors of the Journal have been: Daniel B. Smith, 1825-1828; Benjamin Ellis, 1829-1831; Robert E. Griffith, 1831-1836; Joseph Carson, 1836-1850; William Procter, Jr., 1850-1871; John M. Maisch, 1871-1893; Henry Trimble, 1893-1898; Henry Kraemer, 1898-1917; George M. Beringer, 1917-1921, and Ivor Griffith, 1921-1941.

Established and maintained as a record of the progress of pharmacy and the allied sciences, the Journal's contents and policies are governed by an Editor and a Committee on Publications elected by the members of the College.

Manuscripts should be sent to the Editor, who does not assume any responsibility in connection with the views or investigations of contributors of accepted manuscripts, other than to exercise general care in selection.

Contributors are allowed a reasonable number of copies of this Journal, free of charge, if applied for when the proof is returned.

Reprints, if desired, should be ordered when the proof is returned. The table below shows the *approximate* cost of reprints, the make-up of the pages to be identically the same as in the Journal. The actual cost may vary from the figures given, and will depend upon the amount of presswork, paper, binding, and other factors. Reprints containing half-tones may be expected to cost somewhat more than the rates given.

	2 pp.	4 pp.	8 pp.	16 pp.	Covers with Titles
50 copies	$3.50	$6.00	$10.50	$11.25	50 copies .....$ 5.00
100 "	4.25	7.00	14.00	15.00	100 " 6.50
250 "	5.25	9.00	18.75	20.00	250 " 10.25